

FIRST INTERIM PROGRESS REPORT

SBIR Phase I Contract No. DTRT57-07-C-10004
"MEIS System for Pipeline Coating Inspection"

to

US Department of Transportation
SBIR Program Office
Volpe Center
Cambridge, MA

Contractor:
HD Laboratories, Inc.
Issaquah, WA

INTRODUCTION

Work is in progress on the first three tasks of the project. These tasks are:

- 1. Assemble Phase I MEIS System
- 2. Develop Calibration Pipes
- 3. Bury Pipes at PSE site

Progress by task is reported below.

TASK 1--ASSEMBLE PHASE I MEIS SYSTEM

Preliminary design of the system is complete and major system components have been selected, specified, and ordered. Key among these are the FRA (Frequency Response Analyzer) and the system magnetometer. We have decided to use an existing BCS field computer for the Phase I work. Additionally, HD Laboratories recently procured a 3000 watt generator which will supply power in the field.

Details of the key items under procurement are:

FRA	The Circuit Sleuth SA-10 from Core Technology Group in Willow Grove, PA.
Magnetometer	The DFMG28 from Billingsley Aerospace and Defense, Germantown, MD.

The FRA has features ideally suited to the project. It will be used to both calibrate the magnetometer at any test location over the pipe, and to acquire the on-pipe current from the magnetometer at each test frequency. Both the calibration and data files can be exported to Excel for calculating the complex impedance of the pipe-to-soil interface. If project time and funding permits, the FRA software will be modified to perform this calculation directly.

The magnetometer is a highly accurate unit based on fluxgate technology. Its primary use is for underwater military intelligence. It is being delivered with modifications for 1) analog outputs, and 2) an autonull feature to zero out the earth's magnetic field readings. Its specifications include a measurement range of ± 65 microTesla, and an accuracy of 0.02%. It will be configured to accommodate the frequency range of interest, namely DC to 1 kHz.

Final design work is in progress on

- the electronics cabinet for interfacing the FRA to the magnetometer and the test points on the pipe
- Cabling and connectors for the cabinet to pipe and magnetometer connections.

TASK 2--DEVELOP CALIBRATION PIPES

Basic design of the calibration pipes is complete and requests for quote have been placed to a local vendor. Key features of the pipe designs are:

- Eight-foot sections of 8-inch diameter pipe with 14 gage (0.083 in.) wall
- Material is 304L stainless
- End caps of either flat plate or a standard spherical design
- Electrical connections to each pipe end

TASK 3--BURY PIPES AT PSE SITE

A planning meeting is scheduled at PSE (Puget Sound Energy) during the week of January 29. HD Laboratories will give a short presentation on MEIS. Discussions on test site selection for burying the pipes will also be conducted.